



## ANALOGUE UNIT

For  
PSM-R /M2  
DISPLACEMENT SENSORS

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## Analogue output unit



The analogue output unit is a stand-alone micro controller based unit, which communicates with the measurement unit via serial interface and at 19200 baud communication speed. The unit is supplied by an external 12 VDC power supply.

The unit produces a voltage output (0-5 V), scaled to 10 mrad angle in full scale. The final position of the target can be calculated by multiplying the angle value by the distance between the measurement unit and the target. 0-10V output is also possible on request.

The output scale of the unit is:

PSM-R/M2            1 mrad = 0.5V (0-5V); 5V = 10 mrad

$$1 \text{ mrad} = 180/\pi/1000 \approx 0.05729577951^\circ$$

$$1 \text{ mrad} = 10 \text{ mm} / 10 \text{ m}$$

$$\text{Displacement from zero line (mm)} = \text{distance (m)} * ((\text{AO signal (V)}) - 2.5 \text{ V}) * 2$$

## Example 1:

At 120 m distance the analogue output value is 3.5 V.

The displacement =  $120 * (3.5 - 2.5) * 2 = 240$  mm

## Example 2:

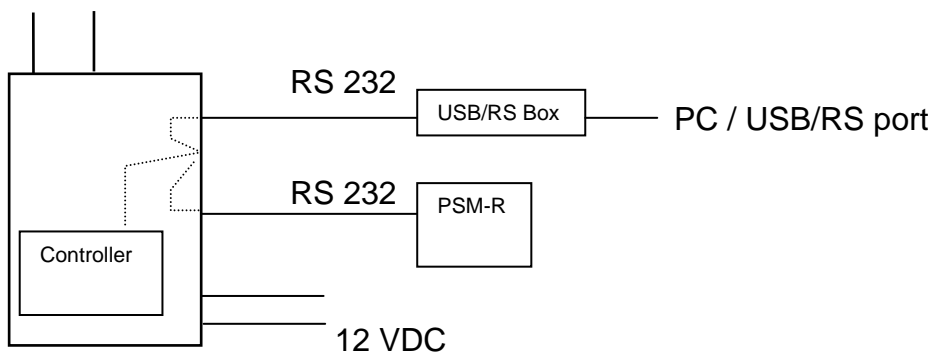
At 10 m distance the analogue output value is 1.0 V.

The displacement =  $10 * (1.0 - 2.5) * 2 = - 30$  mm

The measurement unit automatically controls the transmitter optical power to produce the best signal for the receiver. If the signal is too weak or too strong, it turns the correspondent error light signal on.

When using an external PC together with the analogue unit, the primary control for the PSMR is the analogue unit. The PC can be connected to the analogue unit to read the measurement data for graphics display and data recording.

### Analogue outputs, X/Y, 0-5V



I/O connections:

- RS 232 for the PSM-R unit
- USB or RS-232 for the PC
- AO1 0-5 V, X-axis
- AO2 0-5 V, Y-axis

Led1, Error, the measurement unit does not respond

- Cable not connected
- PC/analogue unit switch in wrong position
- Low battery voltage
- Error in serial transmission

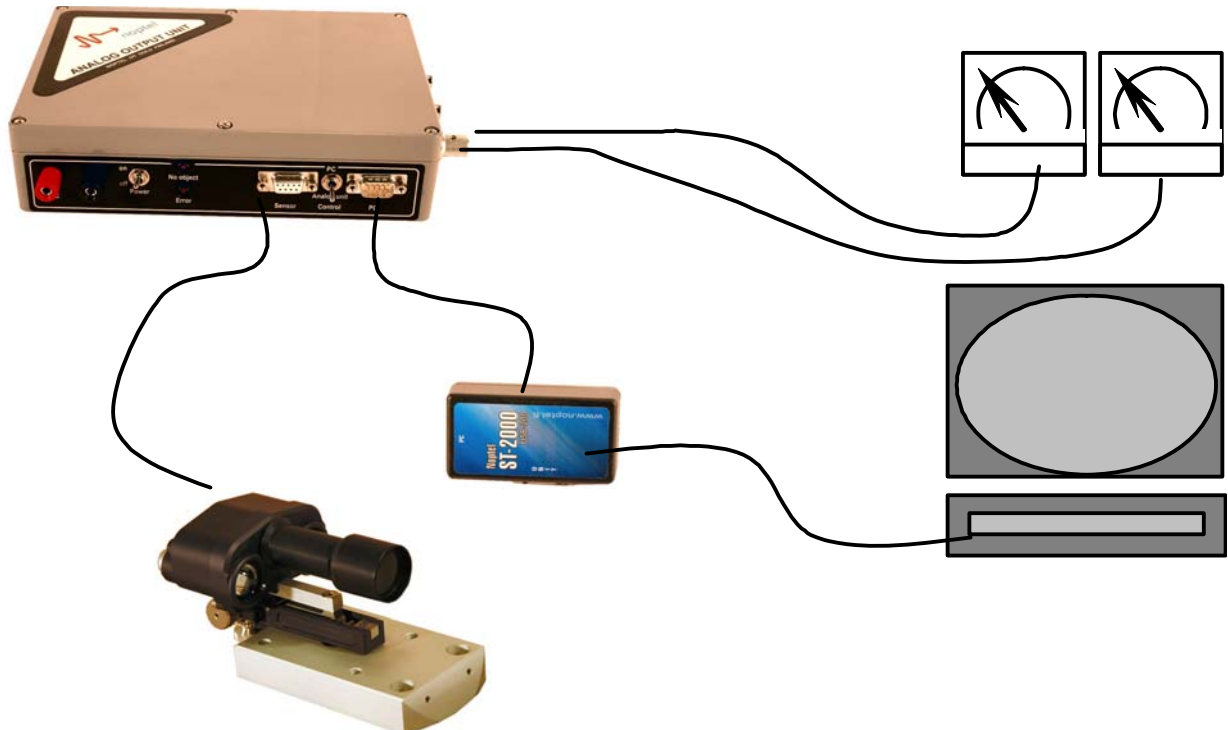
Led2, No Object, signal too low or too high

- No object in receiver sight
- Not enough reflecting power (too long measuring distance)
- Unclean or dirty reflector
- Too strong signal (prism located too near)

Blinking led: automatic power control running

Measurement speed

- 1 meas. speed 20 meas./s, 8 pulses filter (70)
- 2 meas. speed 50 meas./s, 6 pulses filter (54)
- 3 meas. speed 65 meas./s, 4 pulses filter (35)
- 4 meas. speed 100 meas./s, 2 pulses filter (16)



## Limited Warranty

The product has been thoroughly tested and inspected before shipment. All parts (excluding accumulators) are warranted to be free of defects in material and workmanship for one (1) year from the date of the shipment.

The Warranty is always subject to the concurrence of the following three conditions:

- (1) No claims under this Warranty will be honoured unless notice of a defect affecting any specific item of Products is given to Noptel within the warranty period; and
- (2) Any specific item of Products considered by the Buyer to be covered by this Warranty shall be returned, at the Buyer's cost, to Noptel Oy together with a copy of sale document showing the date of purchase within one (1) month from the day of notice as set out above; and
- (3) Noptel Oy shall find such an item of Product returned to Noptel Oy as set forth above defective due to faulty workmanship or use of defective materials.

If Noptel Oy finds the Product to be defective, Noptel Oy's liability under this Warranty is limited to repair or replacement of the Product free of charge, Ex Works (EXW), Oulu, Finland, or credit for an amount equal to the invoiced value of the defective Product.

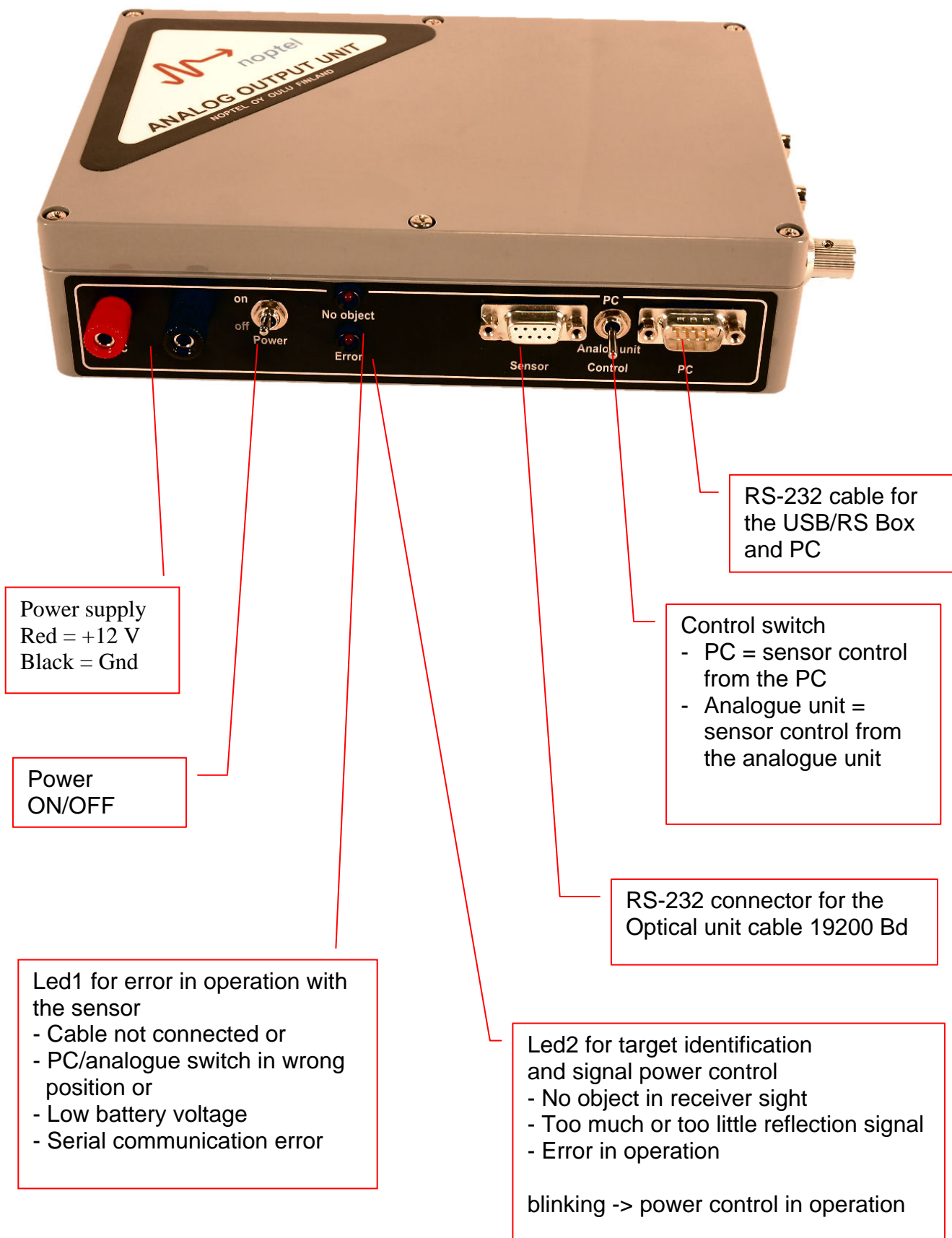
- When sending a Product for the repair, please attach an explanation of the defect to the shipment in order to expedite and facilitate service.
- This Warranty excludes all consequential damages.
- The Warranty will terminate, if an unauthorised person opens the units during the warranty period.
- This Warranty does not cover defects caused by misuse or improper handling, installation or maintenance of the products.
- Always follow the rules and hints for the proper handling and maintenance given by the manufacturer. The units contain no user serviceable parts. Manufacturer or dealer is not liable for damages caused by erroneous measurements or inadequate treatment.



Disposal: Do not dispose this product as unsorted municipal waste.

In the European Union all electrical and electronic products, batteries, and accumulators must be taken to separate collection at the end of their working life.

## Analogue output unit / Short form guide





#### Speed control switch

- 1 50 ms / filter 8 pulses (70)
- 2 20 ms / filter 6 pulses (54)
- 3 15 ms / filter 4 pulses (35)
- 4 10 ms / filter 2 pulses (16)

AO2  
0-5 V  
X-axis

AO2  
0-5 V  
Y-axis

1 mrad = 0.5V (0-5V)

Displacement from zero line (mm) = distance (m) \* ((AO signal (V)) – 2.5 V) \* 2

#### Calibration testing:

- disconnect the optical unit
- turn power on
- speed 4 → maximum signal in analogue outputs
- speed 3 → middle signal in analogue outputs
- speed 2 → minimum signal in analogue outputs